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Jodi A. Calderon

Date: 12-21-04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): GEIER et al.

Art Unit: 3673

Serial No. 10/615,014

Examiner: Sunil Singh

Filed: July 8, 2003

Attorney Docket No. 7.145

For: *Vibratory Compactor and Compact Exciter Assembly Usable Therewith*

DECLARATION OF GREGORY J. ORZAL

Commissioner of Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Gregory J. Orzal, hereby declare and state as follows:

1. Referring to my resume (Exhibit 1), I hold a Bachelor's of Science Degree in Mechanical Engineering Technology from the Milwaukee School of Engineering, which I received in 1973, and an Associate Degree in Fluid Power Technology, which I received from the Milwaukee School of Engineering in 1971. I am also a registered professional engineer with the State of Wisconsin. I have over 20 years of experience in design of mechanical systems. I have been employed by Wacker Corporation since June of 1981, where I design a variety of ground compaction equipment including vibratory plate machines, tampers, and vibratory rollers. I am familiar with the products of Wacker Corporation and with those of its competitors. I consider myself to be skilled in the art of ground compaction equipment, including vibratory compactors.

2. I am familiar with the contents of U.S. Patent Application Serial No. 10/615,014, entitled "Vibratory Compactor and Compact Exciter Assembly Usable Therewith" (the '014 application). I am also familiar with French Patent No. 1567198 (the French '198 patent) and with the translation[1] thereof, which is attached as Exhibit 2. I have also reviewed and understood a paper, which is styled "Amendment" (the Response) which I understand is being submitted herewith.

3. I have read the Examiner's Office Action of August 25, 2004 in which various claims are rejected as being anticipated by the French '198 patent. The Examiner contends that the French '198 patent discloses a method of assembling an exciter shaft assembly after which the free swinging weights 22 and 24 are restrained from substantial axial movement along the exciter shaft solely by the fixed eccentric weight 18 and another component of the exciter assembly, which the Examiner contends is designated by the shaded area between the members 14 and 22 and 16 and 24 in Figures 2 and 4. The Examiner contends that these components are "operative components" of the exciter shaft assembly. I believe, based on my reading of the French '198 patent and my understanding of the state of the art that the Examiner is mistaken.

4. The mechanism disclosed in the French '198 patent is typical of so-called "dual amplitude exciters" manufactured in the industry prior to the development of the present invention. The free swinging weights of all such exciters are mounted on the exciter shaft using mounting hardware such as fixed spacers or ring retainers that

[1] Translation obtained from a commercial translator. Verification of the accuracy and truth of the translation of the French-language document can be obtained independently if necessary.

positively couple the weights to the exciter shaft so as to permit them to rotate between their first and second positions while restraining them from substantial axial movement along the exciter shaft. This mounting hardware substantially increases the overall complexity of the exciter assembly, hindering assembly of the machine and increasing the exciter's cost. The extra hardware required to mount the free swinging weights to the exciter shaft also at least marginally increases the weight of the exciter assembly, thereby increasing its inertia, undesirably increasing exciter start-up time. The mounting hardware also increases the overall length of the exciter beyond that which would permit it to be mounted within an axle housing of standard length. Providing a longer axle housing is not an option because the length of the axle housing is restricted by the width of the overall machine, which must be narrow enough to permit the trench roller to be placed inside a trench.

5. In contrast, the invention disclosed and claimed in the '014 application provides a method of making an exciter assembly having free swinging eccentric weights that are mounted on the exciter shaft so at to restrain them from substantial axial movement along the exciter shaft solely by the fixed eccentric weight and additional operative component of the exciter assembly that is fixed to the exciter shaft. Each of the operative components may, for instance, be a bearing or a gear.

6. The exciter disclosed in the French '198 patent is typical of prior art exciter assemblies. According to its translation, attached as Exhibit 2, the main goal of the '195 patent is to permit the imbalance of an imbalanced vibrator to be modified at a

lower cost then was theretofore possible, without the need to open the housing for any assembly operation.

That need is said to be met by providing free swinging weights generally. There is no discussion of the manner in which the free swinging weights are mounted on the shaft. To the contrary, the translation of French '198 patent merely states that they are "mounted in a free rotation on each side of the first centrifugal mass." See page 1, line 16 and page 2, lines 3 and 4 of the translation. At the time that this invention was made in 2000, I would have construed the term "mounted" to refer to a standard technique for mounting free swinging weights of a dual amplitude exciter on the shaft. Those techniques are limited to the use of traditional mounting hardware such as retaining rings or fixed spacers located radially between the free swinging weights and the shaft and/or axially between the free swinging weights and the next adjacent component of the exciter shaft. Components referenced by the Examiner, denoted "H" in the following marked up copy of the Figure 1 of the French '198 patent, constitute exactly that type of mounting hardware. These components do not constitute operative components of an exciter assembly, as those components are known to me and others skilled in the art. Operative components instead are those that perform a significant function of the exciter assembly as a whole. These include, for example, fixed weights, bearings, or gears. Hence, the French '198 patent is not in my opinion anticipate any claims of the '014 patent application.

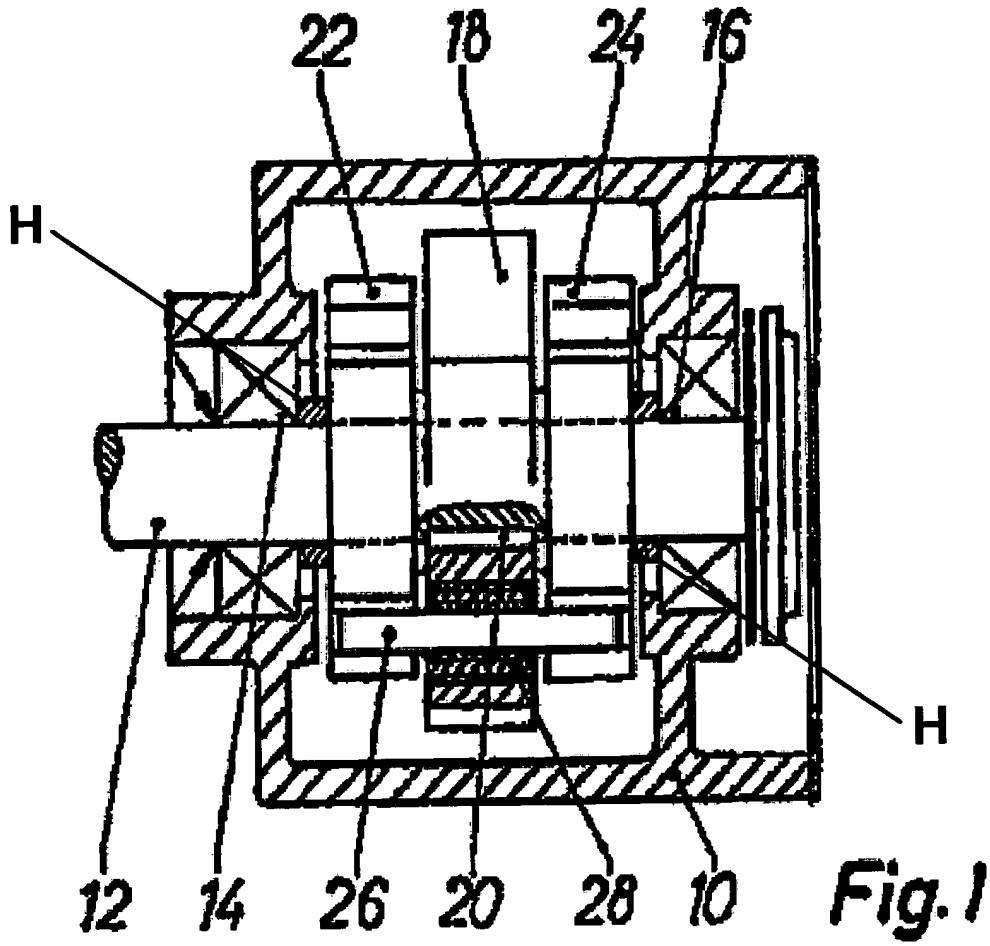

Fig. 1

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardized the validity of the application or any patent issued thereon.

Dated: 21 Dec. 2004

Gregory J. Orzal

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460 Birch Lane
Hartford WI 53027

Education:
AAS Fluid Power Technology / Milwaukee School of Engineering / Received 1971
BS Mechanical Engineering Technology / Milwaukee School of Engineering / Received 1973

Professional Certification:
Registered Professional Engineer State of Wisconsin

Work Experience:

Feb. 1973 to xxx 1978	Project Engineer / Webster Electric Company / Racine WI Design and development of hydraulic pumps and valves
xxx 1978 to June 1981	Sr. Design Engineer / Raymond Corporation / Greene NY Responsible for electrically driven narrow isle fork truck hydraulic circuit design and development
June 1981 to Present	Sr. Project Engineer / Engineering Manager / Wacker Corporation / Menomonee Falls WI Responsible for design, development and engineering maintenance of Wacker's vibratory compaction roller line. Management of the entire compaction engineering department consisting of rollers, rammers and plates.

EXHIBIT 1

REPUBLIC OF FRANCE

MINISTRY OF INDUSTRY

DEPARTMENT OF INTELLECTUAL PROPERTY

PATENT

Report No. 9,102, Bas-Rhin
International Classification

No. 1,567,198
B 06 b

Imbalance Vibrator. (Invention: Hans-Georg WASCHULEWSKI
Company: LOSENHAUSEN MASCHINENBAU AKTIENGESELLSCHAFT
residing in the Federal German Republic.

Application filed February 23, 1968, at 6:17 p.m., in Strasbourg.
Issued in an order dated April 8, 1969.
(Official Gazette of Intellectual Property, No. 20, May 16, 1969.)
(Patent application filed in the Federal German Republic on March 10, 1967, under no. L 55.970, in the applicant's name)

This invention concerns an imbalance vibrator of the type comprising two centrifugal masses that can be offset by rotating them in relation to one another to change the magnitude of the imbalance.

In known imbalance vibrators of this type, the imbalance adjustment is offset in two ways. It is either offset while it is turned off, in which case the housing is opened and the imbalance masses are clamped or screwed in a modified relative position on the shaft, or it is adjusted while in operation, but then complicated differential mechanisms are necessary that impose technical costs that are generally unacceptable in practice.

The invention is intended to permit the imbalance of an imbalance vibrator to be modified at a lower cost, without the need to open the housing, or for any assembly operation.

The vibrator according to the invention is characterized by the fact that a first centrifugal mass, directly driven, has a drive device that drives a second centrifugal mass mounted in free rotation coaxial to the first, following the direction of rotation, in either of two positions offset from one another at an angle.

With the help of this device, the resulting imbalance between the two determined values for either of the angular positions taken by the second centrifugal mass can be easily changed by reversing the direction of rotation.

An advantage is that the first centrifugal mass is connected to a braking device.

The invention may be made in such a way that the second centrifugal mass is formed by two plates or disks, roughly semicircular in shape, which are mounted in free rotation on each side of the first centrifugal mass, also formed by a disk, in a semicircular shape, and on its shaft, these second disks being rotated by a shaft mounted in the first centrifugal mass. It results in a relative rotation of practically 180°. The imbalance values of the centrifugal masses must naturally be different, so as not to obtain an offset effect in a relative position of the masses.

In order to dampen the shock produced when the rotation is switched, the drive shaft may be mounted in a flexible metal able to vibrate and inserted into semicircular holes in each piece comprising the second centrifugal mass.

This invention may be used in the case of circular vibrations. However, it is also possible to connect two pairs of such centrifugal masses to one another by means of a cog wheel. The description is related to two forms of embodiment of the invention, given by way of example, and not as a limitation, and explained, with reference to the attached drawings, in which:

Figure 1 is a longitudinal section of a vibrator according to the invention designed as a circular vibrator.

Figure 2 is a transverse section of a vibrator according to the invention, designed as a directed vibration device;

Figures 3 and 4 are representations analogous to those in figures 1 and 2 in the case of the opposite direction of rotation.

Figure 5 is a longitudinal section and figure 6 is a transverse section of a vibrator according to the invention, designed as a directed vibrations device.

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EXHIBIT 2

[1.567.198]

Figures 7 and 8 are corresponding representations for the opposite direction of rotation.

In figures 1 to 4, a drive shaft 12 is supported in a housing 10 in bearings 14 and 16 and it is connected to a brake 17. A first centrifugal mass 18 to 20 is fastened to the shaft 12. A second centrifugal mass is comprised of two parts 22 and 24 that rotate freely on the shaft 12 on each side of the first centrifugal mass 18. The first centrifugal mass 18 has on its edge an axial drive shaft 26 which is supported in a flexible metal capable of vibrating. This drive shaft 26 rests, depending on the direction of rotation, in one of the two half-cylinder-shaped holes 30 and 32 of each of the parts 22 and 24 comprising the second centrifugal mass and drives the latter. In the case of clockwise rotation (fig. 2), it is driven in such a way that the two centrifugal masses are operated in the same direction. The resulting imbalance is therefore equal in this case to the sum of the imbalances of the first and second centrifugal masses, 18 and 22, 24. When rotation is in a counterclockwise direction, the first and second centrifugal masses are offset from one another by 180° and the resulting imbalance is equal to the difference between the individual imbalances.

In the case of the directed oscillations vibrator in figures 5 to 8, two systems 36 and 38, of the type represented in figures 1 to 4, are positioned in a common housing 34. The parts analogous to those in figures 1 to 4 are designated by the same reference names, but with the addition of an "*a*" sign for system 36 and a "*b*" sign for system 38. The two shafts 12*a* and 12*b* are connected to one another by means of cog wheels 40 and 42, in such a way that the systems always turn in opposite directions to one another. The drive pins 26*a* and 26*b* are positioned in such a way that, in both directions of rotation the resulting imbalances of the two systems are identical.

SUMMARY

The invention includes, in particular, the following characteristics, as well as their various possible combinations:

1. An imbalance vibrator of the type comprising two centrifugal masses that can be offset from one another by rotation, in order change the imbalance — a vibrator characterized by the fact that a first directly driven centrifugal mass has a drive device that drives a second centrifugal mass mounted in free rotation coaxially to the first, in the direction rotation, in one of two positions offset at an angle from one another;

2. The first centrifugal mass is connected to a brake;

3. The second centrifugal mass is closed by two semicircular disks that are supported, one on each side of the first centrifugal mass, also semicircular in shape, rotating freely on the same shaft, and rotated by a drive shaft mounted on the first centrifugal mass;

4. The driveshaft is supported in a metal capable of vibrating and fits into one of two half-cylinder-shaped holes in each of the two parts of the second centrifugal mass.

5. The device comprises two pairs of centrifugal masses connected to one another by means of cog wheels, in such a way that they rotate in opposite directions to obtain directed oscillations.

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[figures]